What is claimed is:

1.

A biodegradable, oxidized cellulose ester.

2.

A biodegradable, oxidized cellulose ester according to claim 1 containing at least 3% by weight carboxyl content.

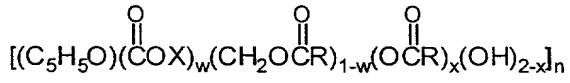
3.

A biodegradable, oxidized cellulose ester according to claim 2 containing between about 3-25% by weight carboxyl content.

4.

An oxidized cellulose ester according to claim 1 having the following general formula I or II:

I.



wherein:

X is selected from the group consisting of H, Na, K, Ca, NH_4, and NEt_3H;

R is selected from the group consisting of H; CF_3; $(CH_2)_nCH_3$, where n is from 0 to 18; $(CH_2)_nCOOH$, where n is from 1 to 8; CY=CZCOOH, where Y and Z are each one of hydrogen, methyl, branched alkyl having from 1 to 20 carbon atoms and from one to three *cis* or *trans* double bonds; branched alkenyl having from 1 to 20 carbon atoms and having from one to three *cis* or *trans* double bonds; $CY=CH_2$, where Y is H, methyl, or phenyl; CH=CHY, where Y is

C_6H_5; CH=CYCOOH, where Y is H or CH_3; $(CH_2)_8CH=CH(CH_2)_8CH_3$; or $C_6H_{(2-6)}(COOH)_{0-4}$, $CH_2CH(COOH)CH_2$-COOH;

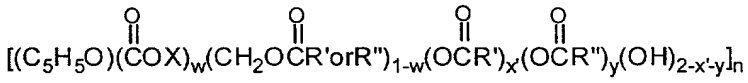
w is 0.1-1.0;

x is 0.1-2.0; and

n is 30-1500.

and

II.



wherein:

X is selected from the group consisting of H, Na, K, Ca, NH_4, and NEt_3H;

R, R', and R" are each selected from the group consisting of: H; CF_3; $(CH_2)_nCH_3$, where n is from 0 to 18; $(CH_2)_nCOOH$, where n from 1 to 8; CY=CZCOOH, where Y and Z are independently selected from the group consisting of hydrogen, methyl, branched alkyl having from 1 to 20 carbon atoms and from one to three *cis* or *trans* double bonds; branched alkenyl having from 1 to 20 carbon atoms and having from one to three *cis* or *trans* double bonds; CY-CH_2, where Y is H, methyl, or phenyl; CH=CHY, where Y is C_6H_5; CH=CYCOOH, where Y is H or CH_3; $(CH_2)_8CH=CH(CH_2)_8CH_3$; or $C_6H_{(2-6)}(COOH)_{0-4}$, $CH_2CH(COOH)CH_2$-COOH;

w is 0.1-1.0;

x is 0.1-1.9;

y is 0.1-1.9; and

n is 30-850.

5.

An oxidized cellulose ester according to claim 4 that has the general structure I or II, whereby R is $(CH_2)_nCH_3$, and n is 0 to 5.

6.

An oxidized cellulose ester according to claim 4 that has the general structure I or II, whereby R is $(CH_2)_nCOOH$, and n is 2 to 4.

7.

An oxidized cellulose ester according to claim 1 that is dried.

8.

An oxidized cellulose ester according to claim 1 that is in a monolithic transparent film.

9.

An oxidized cellulose ester according to claim 1 that is in a biodegradable coating.

10.

An oxidized cellulose ester according to claim 1 that is present in a product selected from the group consisting of a pharmaceutical, an agricultural product, and a veterinary composition.

11.

An oxidized cellulose ester according to claim 1 that is soluble in at least one solvent selected from the group consisting of water, ketones, esters, glycol ethers, glycol ether acetates, alcohols, methylene chloride, halogenated solvents, and aprotic solvents.

12.

An oxidized cellulose ester according to claim 11 whereby the aprotic solvents are selected from the group consisting of DMSO, DMA, DMF, and n-methyl-2-pyrrolidone.

13.

A method of making an oxidized cellulose ester comprising:
oxidized cellulose containing at least 3% by weight carboxylic content to form an oxidized cellulose ester.

14.

A method according to claim 13 whereby the acylating step comprises: reacting the oxidized cellulose with an organic acid.

15.

A method according to claim 14 whereby the organic acid is a C_1-C_3 organic acid.

16.

A method according to claim 13 whereby the acylating step comprisese reacting the cellulose with an organic acid and an acid anhydride.

17.

A method according to claim 16 whereby the acid anhydride and the organic acid each have the same number of carbons.

18.

A method according to claim 13 further including the step of soaking the oxidized cellulose with a swelling agent prior to the acylating step.

19.

A method according to claim 18 whereby the swelling agent is selected from the group consisting of phosphoric acid, isopropyl alcohol, aqueous zinc chloride solution, water, and an amine.

20.

A method according to claim 18 whereby the oxidized cellulose is soaked in the swelling agent for a time period of between about 5 to 120 minutes.

21.

A method according to claim 20 whereby the oxidized cellulose is soaked in the swelling agent for a time period of between about 30-60 minutes.

22.

A method according to claim 13 whereby the oxidized cellulose is acylated in the presence of an acid catalyst.

23.

A method according to claim 22 whereby the acid catalyst is selected from the group consisting of sulfuric acid, o-phosphoric acid, perchloric acid, and zinc chloride solution.

24.

A method according to claim 13 whereby the oxidized cellulose is acylated in the presence of an organic solvent.

25.

A method according to claim 24 whereby the organic solvent is selected from the group consisting of DMSO, DMF, DMA, and dioxane.

26.

A method according to claim 13 whereby the acylating step comprises:

reacting the oxidized cellulose with an organic acid chloride, in an organic solvent, and a base catalyst.

27.

A method according to claim 26 whereby the organic acid chloride is a C_1-C_{20} organic acid chloride.

28.

A method according to claim 26 whereby the organic solvent is selected from the group consisting of DMSO, DMF, DMA, and dioxane.

29.

A method according to claim 26 whereby the base catalyst is selected from the group consisting of pyridines, alkylpyridines, trialkylamines and sodium carbonate.

30.

A method according to claim 13 whereby the acylating step takes place at a temperature ranging between about 5-125°C.

31.

A method according to claim 13 whereby the acylating step takes place for a time period of about 0.5-12 hours.

32.

A method according to claim 13 further including the step of filtering the oxidized cellulose ester.

33.

A method according to claim 32 further including the step of washing the oxidized cellulose ester to a pH between about 6-8 following the filtering step.

34.

A method according to claim 33 further including the step of drying the oxidized cellulose ester following the washing step.

35.

A pharmaceutical containing the oxidized cellulose ester of claim 1.